Knowledge Base Editing with QMR-KAT

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Constructing medical knowledge bases can be separated into two activities: assembling medical facts into knowledge, and converting the knowledge into a form that can be integrated with a knowledge base. To some extent, the two activities can be carried out independently. In the traditional model of knowledge acquisition, for example, the former activity was performed by a domain expert, and the second by a so-called knowledge engineer.

The current trend is towards allowing domain experts to perform much of the knowledge acquisition process independently [1,2]. This approach, however, requires tools that contain much knowledge about the structure of the knowledge base, because domain experts cannot be expected to be also familiar with the details of the knowledge engineering process.

QMR-KAT, the QMR Knowledge Acquisition Tool [3,4], was built to allow physicians with no expertise in knowledge base construction to create QMR disease profiles. It does so by incorporating substantial amounts of knowledge about the internal structure of the knowledge base, and by relying on the existing contents of the knowledge base to help guide the process of adding new information. In addition to capturing conventional knowledge base information, the program allows physicians to annotate every piece of information with references to the supporting evidence. Typically, such references take the form of bibliographical references to the published medical literature that was used during the knowledge acquisition process. This effectively makes the supporting evidence a permanent part of the record.

The QMR-KAT interactive knowledge acquisition tool has been used by dozens of physicians throughout the country to create all new QMR disease profiles for the last three years. First-time users, who typically have little experience in using computers, have been able to create new disease profiles successfully with minimal training.

QMR-KAT is now being extended to support full editing of the knowledge base by knowledge base maintainers. We have added new functionality that allows every aspect of the knowledge base to be examined and modified as needed. This was accomplished by keeping the same user interface and extending the program's data handling capabilities, thus supporting the same interactive, direct-manipulation approach. The extended version of QMR-KAT is now being used for the ongoing knowledge base maintenance and the integration of new disease profiles.

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